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ECHINASTER SEPOSITUS MADSENI N. SUBSP., FROM WEST AFRICA

(*Echinodermata Asteroidea*)

Abstract. — A new West African subspecies of the predominantly Mediterranean asteroid *Echinaster sepositus*, is described.

Riassunto. — Echinaster sepositus madseni *n. subsp., dell'Africa Occidentale* (Echinodermata Asteroidea).

Del comune Asteroideo *E.s.*, soprattutto mediterraneo, è descritta la nuova sottospecie *madseni*, dell'Africa occid. a Sud del Capo Verde.

In the course of preparation of a comprehensive study on the Asteroidea of the Atlantic, with M. E. Downey of the U. S. National Museum, A. M. Clark has been reviewing the genus *Echinaster*. This has involved identification of various unworked collections, including three specimens of *Echinaster* from two stations of the « Pillsbury » (University of Miami) in the Gulf of Guinea, West Africa. Although these specimens appear to be conspecific with *Echinaster sepositus* (Retzius, 1783), not only are their arms consistently attenuated but also microscopic examination of the plating after partial removal of the skin has revealed inconspicuous patches of crystal bodies or glassy tubercles (the terminology of these varies) embedded in some of the plates. The only other specimen of *Echinaster* in the British Museum collections from south of Cape Verde is from « Atlantide » st. 61, off Liberia: it also shows these two characters.

Tortonese & Downey (1977) proposed reviving the genus *Othilia* Gray, 1840, type species *Asterias echinophora* Lamarck, from the sy-

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nonymy of *Echinaster* Müller & Troschel, 1840 on account of the presence of well developed crystal bodies. Since *E. sepositus* is the type species of *Echinaster* the new observation is clearly of some taxonomic significance. From his wide experience of *E. sepositus* in the Mediterranean, TORTONESE has confirmed his statement of 1977 (in TORTONESE & DOWNEY) that crystal bodies have not been observed in specimens from this area. Whereas two of his own specimens, from Goree, just south of Cape Verde, do show a few plates with small patches of crystal bodies. Although in Mediterranean specimens the shape of the arms is somewhat variable, they are more often moderately broad at the tip than narrow. Since these differences appear to be correlated geographically and the Cape Verde-Sierra Leone area is known to be a transition zone within which lie the southern limits of a number of other benthic shelf taxa of predominantly Mediterranean range, we have concluded that the Echinasters from localities south of Cape Verde merit subspecific distinction within *E. sepositus*. At the same time, Clark, with the agreement of Tortonese, has decided that *Othilia* would be better ranked as a subgenus of *Echinaster*. Although the value of occurrence of crystal bodies as a taxonomic character now appears to be less than before, *Othilia* is also distinguished by retention of more or less regular primary plating on both the disc and the midradial area of the arms of adults, unlike *Echinaster* sensu stricto, in which these parts of the reticulum are randomly arranged in adults.

We propose to name the new subspecies after our valued colleague Dr F. Jensenius Madsen, University Zoological Museum, Copenhagen, with thanks for his help and advice over many years.

Echinaster sepositus madseni subsp. nov.

Echinaster sepositus (part) MADSEN, 1950: 219; NATAF & CHERBONNIER, 1975: 824-825.

Holotype. « Atlantide » st. 61, 04° 57′ N, 09° 26′ W, off Liberia, West Africa, 95 m; BM (NH) reg. no. 1950.7.3.25.

R 43-45 mm, r 8.0 mm, R/r 5.6/1. Br (basal arm breadth) 8.5 mm; br (distal breadth 10% R from tip) 3.0 mm, Br/br 2.8/1. Arms long and narrow, more attenuated distally. Abactinal plates mostly forming a coarse lattice-like reticulum, except interradially where they imbricate without meshes, most plates with 1 spine, sometimes 2 or even 3; some spines blunted, others pointed, length up to 0.5 mm.; 2-5 papulae and dermal glands in each mesh.

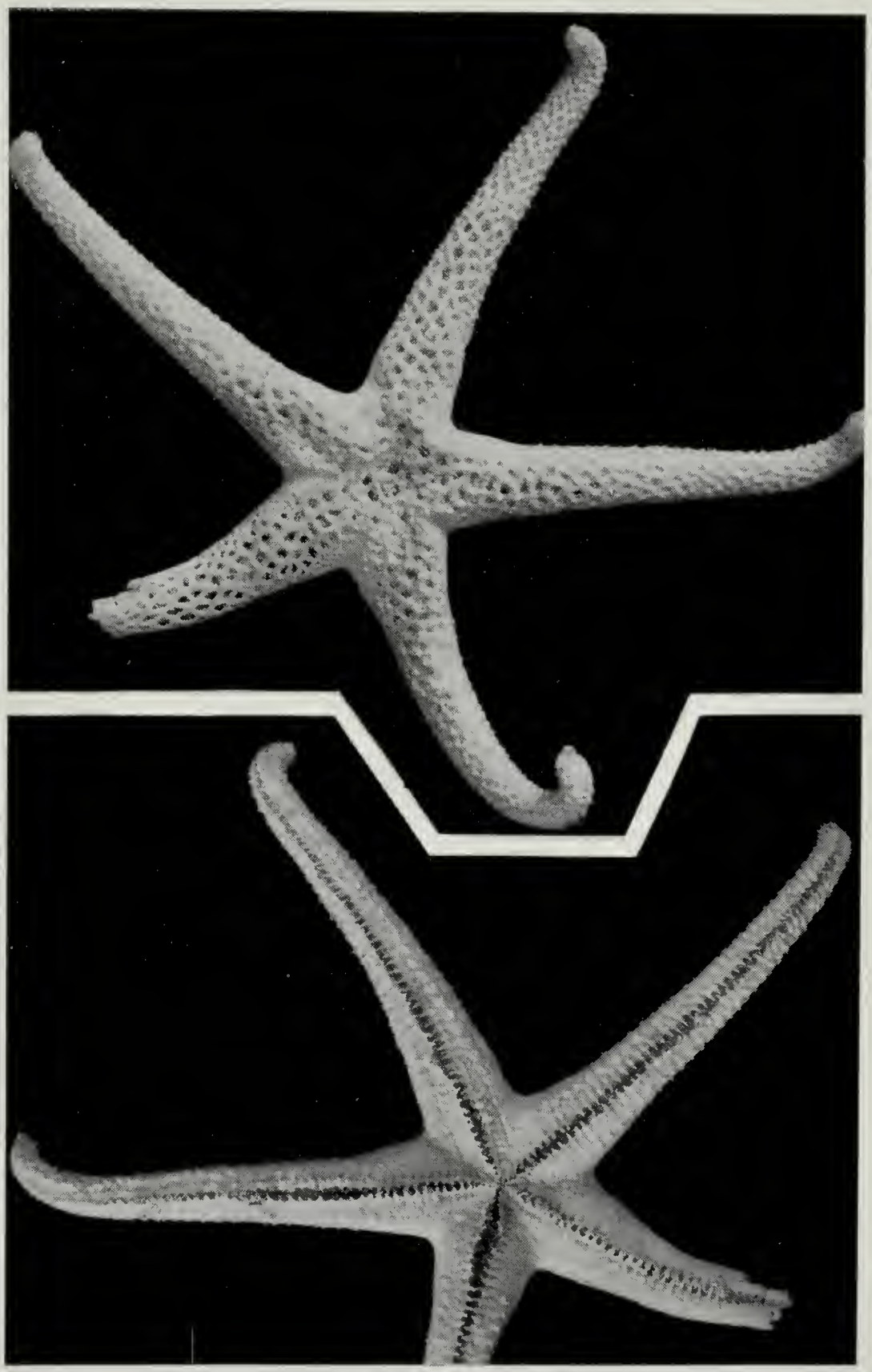

Fig. 1. — *Echinaster sepositus madseni.* Holotype. BM (NH) reg. no. 1950.7.3.25. « Atlantide » st. 61, off Liberia, 95 m. x 1.5.

Marginal series well defined throughout, 45-50 plates in each series; superomarginals elongate, the corresponding inferomarginals broader; proximal superomarginals spineless, the remaining plates with 1 spine, inferomarginals mostly with 2, or distally 1. The two series separated proximally by c. 12 intermarginal plates. No papulae present below superomarginals.

Two short series of spineless actinal plates, of 13 and 7 plates respectively on the area cleaned of skin; those of the outer series small.

Adambulacral plates mostly bearing 3 spines; the inset one very small and curved; that on the furrow margin the largest, some exceeding 1.0 mm in length, tapering at the tip to a rounded point, not webbed together longitudinally; the abradial spine absent on the proximal plates (elsewhere often appressed in drying and completely embedded in the skin). Each oral plate with 3 (4) spines on the furrow margin.

Well developed patches of crystal bodies present on some of the more lateral (abradial) abactinal plates (Fig. 2), usually on the slightly hollowed area below the elevation bearing the spine; also present on some

Fig. 2. — *Echinaster sepositus madseni*. Holotype. Dorso-lateral view of small proximal part of arm, distal to right, including eleventh and twelfth supero- and inferomarginal plates. Scale 1 mm.

of the spineless proximal marginal plates and even on a few plates of the main actinal series, their contours distinguishable through the dried skin covering the interradial inferomarginals.

Madreporite small and circular, gyri tending to radiate; encircled by c. 14 small blunt spinules. Anus guarded by 5 large and 1 small triangular valves.

Colour in life unknown; white in dried condition.

Other specimens: « Pillsbury » st. 23, 05° 09′ N, 00° 26.5′ W, off Ghana, 42 m; 1 specimen. St. 63, 04° 35′ N, 06° 40.5′ W, off Ivory Coast, 64 m; 2 specimens. (These three designated as paratypes and shared between US National Museum, British Museum (Nat. Hist.) and Tortonese collections). Tortonese Collection, Goree, Dakar, Senegal; 2 specimens.

(See table for measurements) The three « Pillsbury » specimens have the arms slightly widened basally, tending to round off the interbrachial angles, and are attenuated distally. The primary plates have 1-3 inconspicuous spines up to 0.75 mm long, tapering to rounded tips, but some are occasionally almost cylindrical and more broadly rounded terminally. There are *c.* 50 marginals in each series and the superomarginal spines are up to 1.25 mm long. One specimen has crystal bodies on only a few interradial inferomarginals on the lower face of the disc but the others also show patches on some of the proximal abactinals and superomarginals in a slightly sunken patch only visible when the thick skin is removed. As in the holotype, there is no longitudinal webbing on the furrow margin spines, which are up to 2.0 mm long. The occurrence of the third (abradial) spine is variable; in one specimen it is present on only about half the plates. The Goree specimens, as preserved, are clear brown in colour and were probably red in life like *E. sepositus sepositus*.

Discussion. Because of its greater development of crystal bodies, the smaller « Atlantide » specimen is selected as holotype. Possibly the development of this surface modification of the plates will prove to be correlated with size, the patches becoming eroded or submerged in the general matrix of the plates in larger specimens. Certainly, even in the holotype, they are nothing like so prominent as in the species of *Othilia* from the american side of the Atlantic. In the only other tropical Atlantic species of *Echinaster* sensu stricto, *E. modestus* Perrier, ranging from the Gulf of Mexico to French Guiana, occasional specimens have traces of glassy knobs on a few plates. *E. modestus* differs from *E. sepositus madseni* and also from *E. sepositus sepositus* in its much greater density of spines on the lower surface.

Table of measurements (to nearest 0.5 mm, except for R) and ratios for 24 specimens of *Echinaster sepositus sepositus* in the Tortonese and British Museum collections and of *E. sepositus madseni*, as specified in the text.

Locality	R	r	R/r	Br	br	Br/br
Echinaster sepositus sepositus						
Blanes, NE Spain	120	11.0	10.9	18.5	13.0	1.4
Majorca, Balearics	100	12.0	8.3	12.0	8.0	1.5
Cephalonia, Greece	89	12.5	7.1	14.5	6.0	2.4
Cagliari, Sardinia	88	15.0	5.9	16.0	7.0	2.3
Noli, Genoa	85	9.5	8.9	11.0	6.0	1.8
Banyuls, SW France	85	13.0	6.5	14.0	11.5	1.2
Akrotiri, Cyprus	85	13.5	6.3	16.0	8.0	2.0
Akrotiri, Cyprus	85	12.0	7.1	14.0	6.0	2.3
Rovinj, Yugoslavia	83	14.0	5.9	14.5	8.5	1.7
Gulf of Naples	70	10.5	6.7	12.0	8.5	1.4
Akrotiri	70	10.0	7.0	11.0	5.5	2.0
Taranto, S. Italy	68	9.5	7.2	10.0	5.0	2.0
Akrotiri	68	11.0	6.2	12.0	6.0	2.0
Porto Vecchio, Corsica	66	11.0	6.0	11.0	9.0	1.2
Gulf of Naples	65	11.5	5.7	12.0	8.0	1.6
Cape Verde Is	65	9.5	6.8	9.5	6.0	1.6
Cape Verde Is	62	9.5	6.5	10.0	6.0	1.7
Portofino, Italy	62	10.5	5.9	12.5	5.0	2.5
Asia Minor (Turkey)	61	10.0	6.1	11.0	5.0	2.2
Akrotiri	60	11.0	5.4	13.5	6.5	2.1
Paphos, Cyprus	55	9.5	5.8	10.0	5.0	2.0
Gulf of Lyons, S. France	52	9.0	5.8	9.5	4.0	2.4
Gulf of Lyons, S France	52	10.0	5.2	10.5	4.5	2.3
Rapallo, Italy	47	8.5	5.5	9.5	5.0	1.9
Range of R/r: 5.2-10.9/1, mean 6.6/1 in 24 specimens.						
Range of Br/br: 1.2-2.5/1, mean 1.9/1.						
Echinaster sepositus madseni						
Ivory Coast	90	10.0	9.0	10.5	4.0	2.6
Ivory Coast	75	8.0	9.4	9.0	5.5	1.6
Ghana	78	11.5	6.8	12.0	5.0	2.4
Goree, Senegal	70	12.5	5.6	13.0	6.5	2.0
Goree, Senegal	65	12.0	5.4	11.0	4.5	2.4
Liberia, holotype	44	8.0	5.5	8.5	3.0	2.8
Range of R/r: 5.4-9.4/1, mean 6.9/1 in 6 specimens.						
Range of Br/br: 1.6-2.8/1, mean 2.3/1.						

As mentioned in the introduction, the distinction between this subspecies and *E. sepositus sepositus* is based mainly on the occurrence of crystal bodies supported, as far as the unfortunately meagre material available shows, by consistently attenuated arms with a relatively high proximal to distal arm breadth ratio. Additionally, there is some indication in the material studied that the abactinal spines are relatively smaller in *E. sepositus madseni* than is usual in *E. sepositus sepositus* where lengths of *c.* 1.0 mm are common at R 50 mm or more. Also the superomarginal plate series may merge to some extent with the abactinal plating in the distal part of the arm in some specimens of *sepositus sepositus*. However, it remains to be seen from further material to what extent these characters are consistent in the west african subspecies. Some mediterranean specimens also appear to have the furrow margin spines webbed together longitudinally but this may be only an artefact of preservation.

As for the geographical range, 2 specimens in the British Museum (Nat. Hist.) collections from the Cape Verde Islands resemble *E. sepositus sepositus* in having no sign of crystal bodies and the arms blunt-tipped. Therefore it is probable that the other specimens from these islands in 2-3 m on a rocky bottom recorded by NATAF & CHERBONNIER (1975) are also *E. sepositus sepositus* but their remaining material from Dakar southwards, from 40-50 m on sandy substrates, may be referable to *E. sepositus madseni*. If so, the likely range of the new subspecies would be from Dakar to Zaire in 40-95 m on sandy bottoms.

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